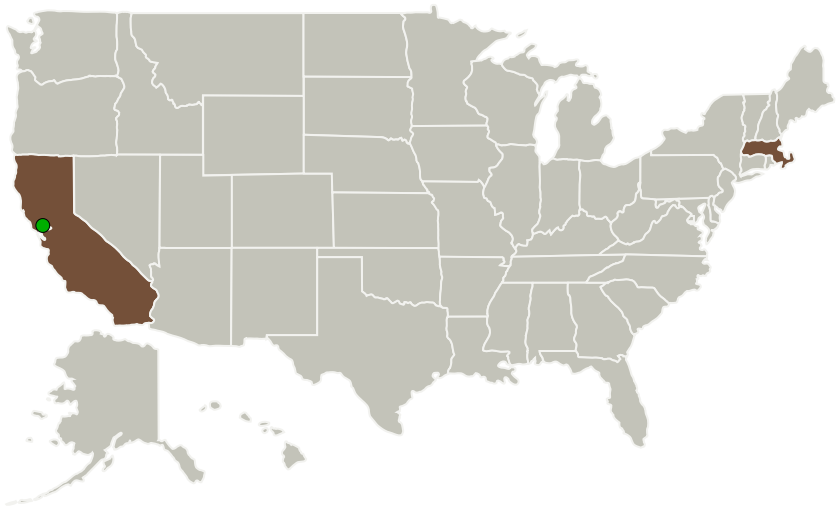
A Robust Flare Planning Logic for Unmanned Aerial Vehicle Applications, Phase II

Completed Technology Project (2010 - 2012)

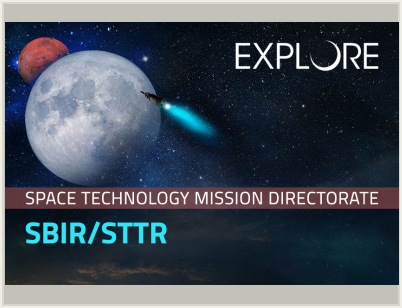
Project Introduction

Aurora Flight Sciences proposes to develop a flare planning methodology that would provide aircraft guidance during this critical phase of flight. The algorithms that Aurora seeks to leverage the reachability problem in the fields of Optimal Control and Hybrid Systems, using Rapidly-Exploring Random Trees (RRTs) and Falsification theory. To this end, Aurora proposes the innovation of applying a suitable version of these algorithms to the design of a flare maneuver guidance and planning logic. The planner will be capable of dynamically producing a flare maneuver that does not violate the aircraft flight envelope and other stipulated constraints. The planner will meet the robustness requirements stipulated in the topic solicitation; namely, it will apply to both impeded and unimpeded aircraft, and it will operate under significant weather disturbances. The main technical challenge in developing the planning logic is extending and applying the chosen control algorithms to 6-DOF aircraft dynamics models under the required variety of operating conditions. The ultimate goal of the Phase 2 effort is to demonstrate Aurora's algorithms in an appropriately sophisticated Hardware-in-the-loop simulation of an impaired aircraft during a flare maneuver.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Primary U.S. Work Locations	
California	Massachusetts

Project Transitions

January 2010: Project Start

July 2012: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138753)*

Project Management

Program Director:

Jason L Kessler

Program Manager:

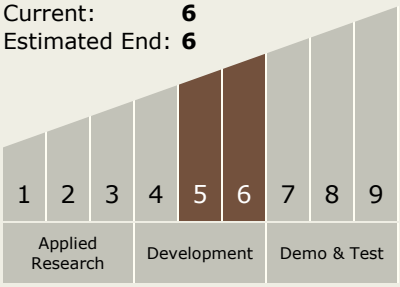
Carlos Torrez

Principal Investigator:

Antonio Abad

Technology Maturity (TRL)

Start: **5**
Current: **6**
Estimated End: **6**



Technology Areas

Primary:

- TX17 Guidance, Navigation, and Control (GN&C)
  - TX17.1 Guidance and Targeting Algorithms
    - TX17.1.1 Guidance Algorithms

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System